

REMARKS/ARGUMENTS

Claims 17-20 and 22-32 are active in the case. Reconsideration is respectfully requested.

The present invention relates to a process for producing flexible polyurethane foams from polyether alcohols based on renewable materials.

Claim Objection and Rejection, 35 USC 112

Applicants have amended Claim 22 so that it recites the publication identified on page 2, lines 32 - 34 of the specification of "Analysis of the Emission of Volatile and Condensable Substances from Vehicle Interior Materials by Thermodesorption." As is clear from the copy of the publication which was submitted VOC and FOG values are reported in parts per million, such as shown at the bottom of page 3 of the text, which is consistent with the parts per million values set forth in tables shown in the last two pages of the publication. Applicants submit that the language inserted into the claim provides the skilled artisan, along with the detailed information in the cited publication, with sufficient information concerning how FOG and VOC values are determined for a foamed polyurethane.

Claim 27 has been amended by reciting the formula used to measure the wet compression set of foamed samples that have been prepared. The description of the determination of the percentage value of compression set is presented at the bottom of page 16 through page 17 of the specification. Details of the method of determination of compression set have been provided on the pages indicated above. Accordingly, sufficient information is introduced into the claims so as to provide the skilled artisan with the information needed to determine the wet compression set of a foamed sample.

As to the matter of the determination of the odor values of polyether polyols, which is relevant to the limitation on strength of odor of a polyether polyol as set forth in Claim 31,

support for the recited standard test method can be found at the bottom of page 12 through to the top of page 32 of the specification. Clearly, the present text contains ample information as to how odor is determined.

None of the amendments made to the claims introduce new matter into the case. Entry of the amendments is respectfully requested. Withdrawal of the rejection is also respectfully requested.

Claim Rejection, 35 USC 103

Claims 1-7 and 15-21 stand rejected based on 35 USC 103(a) as obvious over Sugiyama et al, U. S. Patent 6,313,060 in view of JP-05163342. This ground of rejection is respectfully traversed.

As stated previously on the record, the Sugiyama et al patent discloses a technique of preparing a resilient polyurethane foam. In the process a catalyst for alkylene oxide ring-opening polymerization is prepared, which is a double metal cyanide complex (DMC) that has, as an organic ligand, the compound identified as compound X at the bottom of column 2 of the patent, as well as another compound coordinated thereto. The DMC catalyst is produced by coordinate bonding of an organic ligand to a reaction product obtained by reacting a metal halide with an alkali metal cyanometalate. Specific organic ligands that are coordinated to the complex are described in columns 5 and 6 of the patent. A polyether monol or a polyether polyol having terminal oxyethylene groups is produced by subjecting alkylene oxides to ring opening polymerization with an initiator in the presence of the DMC catalyst, and then completing polyol formation by reactively adding ethylene oxide units to the polyol in the presence of an alkali catalyst. Nowhere does the reference disclose a polyetherpolyol that is prepared by the addition of an alkylene oxide to what can be termed as a renewable raw material of the scope described in present Claim 22 in the presence of a

DMC catalyst. A polyurethane foam product is then formed by reacting a polyisocyanate with the polyether polyol product described in the patent.

The Examiner states at the bottom of page 4 of the Office Action that *Sugiyama et al* is not limited to the specific initiator exemplified. While this could possibly be the case, the point to be made is the patent does not provide the skilled artisan with a hint of preparing a polyether polyol product by addition polymerizing an alkylene oxide with a renewable raw material! On the other hand, as applicants have stated in their specification in the first several pages, that attempts in the past have been made to prepare foamed polyurethane products from polyether polyols that in turn are prepared by the reaction of alkylene oxide with such renewable materials as castor oil, polyhydroxy fatty acids, and the like. The reaction between alkylene oxide and the renewable raw material has been performed in the presence of a base such as potassium hydroxide. In fact, it is known to form flexible polyurethane foams from polyether polyols that have been prepared on the basis of renewable raw materials such as castor oil using basic catalysts. However, the resultant foam product is unacceptable, because the foams produce emissions (odors and fogging). Thus, the polyether polyols that have been prepared under these conventional conditions are unacceptable. This is clearly described at the bottom of page 2 of the specification.

The surprising advantage of the present invention, as stated at page 3, lines 18-23 of the specification, is that when polyether polyols are prepared by an addition polymerization reaction in which an alkylene oxide is polymerized via a ring opening reaction with a renewable raw material in the presence specifically of a DMC catalyst, the product foam does not exhibit unacceptable FOG, VOC and odor characteristics, as is shown by the examples in the application. Accordingly, the present claims are not rendered obvious by Sugiyama et al.

As to the '342 reference, the same discloses the preparation of a polyether by the catalyzed ring-opening reaction of an epoxide (alkylene oxide) and castor oil in the presence

of a DMC catalyst. Most of the disclosure of the reference is concerned with aspects of the preparation of the polyether. The reference makes only the briefest remark in paragraph [0028] of the reaction between a polyether product and an isocyanate to prepare a polyurethane product. Absolutely nothing is mentioned about the renewable raw materials of the present claims, other than castor oil, and nothing is said as to the problems encountered in attempting to use renewable raw materials as a coreactant with epoxide to form a polyether polyol for reaction with a diisocyanate compound in order to prepare a foamed polyurethane product. In other words, there is no teaching at all of the emissions problems associated with the production of polyether polyols in which an initiator of a renewable raw material such as castor oil is addition polymerized with an alkylene oxide. As seen above, polyether polyols prepared by conventional procedures using conventional basic catalysts are unacceptable for the production of polyurethane foams, because of the above stated emissions characteristics. There is no disclosure or suggestion in the reference that the emissions problems can be overcome by using a DMC catalyst in the production of polyether polyols without resorting to additional treatments such as steam stripping of volatiles to prepare an acceptable polyurethane production having an acceptable level of emissions. Nothing in the reference suggests a polyurethane foam having an odor value of 2.0 or less, a maximum VOC value of 100 ppm and a maximum FOG value of 200 ppm.

The Examiner states in the Office Action that *the recited FOG and VOC values lack relevance in distinguishing the claims in a patentable sense*. Applicants strenuously disagree with this judgment, because the written description provides a clear basis for rating the odor, VOC and FOG characteristics of the polyether polyol reactant. These rating values are nowhere shown or suggested in the cited prior art. Accordingly, the combined references do not suggest the present invention and withdrawal of the rejection is respectfully requested.

Appln. No. 10/524,039
Reply to the Office Action of April 1, 2008

It is believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited.

Customer Number

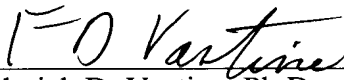
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